

WHAT IS CLAIMED IS:

1. An apparatus for depositing documents at a predetermined location on a moveable collation conveyor for distribution of said documents to a predetermined delivery point, each document imprinted with code designating a distinct delivery point, said documents delivered to said apparatus in a predetermined sequence, the apparatus comprising:

- a) a moveable platform assembly adapted to support and advance a stack of said documents in said predetermined sequence towards a feed station;
- b) a device disposed adjacent said feed station for electronically capturing an image of said delivery point code on each document as each document reaches said feed station;
- c) a moveable buffer platform located adjacent said feed station;
- d) a document unloading assembly adjacent said feed station and adapted to remove the topmost document from the stack of documents and place the topmost document on the moveable buffer platform;
- e) a data processing unit adapted to transmit information received from said captured image of said delivery point code to an actuation device controlling movement of said buffer platform, said data processing unit determining the presence or absence of a match between said delivery point code on the document on said buffer platform and a delivery point designation corresponding to said predetermined location on said collation conveyor;
- f) said moveable buffer platform moveable from a first position substantially above said collation conveyor to a second position substantially above a reject station, said data processing unit controlling movement of said moveable buffer platform between said first and second positions of said buffer platform; and

g) a document positioning device accuated in coordination with said moveable buffer platform and said data processing unit to deposit said document from said buffer platform to said collation conveyor in a first position of said document positioning device and said moveable buffer station, and to retain said document on said buffer platform in a second position of said document positioning device, when said buffer platform moves from said first position to said second position.

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2. The apparatus of claim 1 wherein said data processing unit also determines at least one of (a) the presence or absence of a readable delivery point code on each document, and ~ whether each document is or is not in said predetermined sequence.

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3. The apparatus of claim 1 wherein said reject station is disposed adjacent said collation conveyor, and said moveable buffer platform is disposed substantially above said reject station when said buffer platform is in said second position of said buffer platform.

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4. The apparatus of claim 1 wherein said document positioning device deposits said document from said buffer platform to said reject station when said document positioning device is in said first position and said buffer platform moves from said second position to said first position.

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5. The apparatus of claim 1 wherein said moveable platform assembly includes a first moveable platform slidably and pivotally mounted on said apparatus for sliding movement to a plurality of substantially vertical positions adjacent said feed station, and for pivotal movement in a substantially horizontal direction at each of said vertical positions, said first moveable platform

adapted to support a first stack of documents and advance said stack of documents to said feed station as said moveable first platform moves in a first vertical direction toward said feed station.

6. The apparatus of claim 5 wherein said moveable platform assembly includes a second moveable platform slidably and pivotally mounted on said apparatus for movement to a plurality of substantially vertical positions adjacent said feed station, and for pivotal movement in a substantially horizontal direction at each of said vertical positions, said second moveable platform adapted to support a second stack of said documents adjacent said first stack of documents.

10 7. The apparatus of claim 6 wherein each of said first and second moveable platforms is adapted to be pivotally removed from between and inserted between said first and second stacks of documents.

15 8. The apparatus of claim 6 wherein one of said moveable platforms is disposed between said first and second stack of documents, and the other of said moveable documents supports said second stack of documents adjacent said first stack of documents, said one moveable platform adapted for pivotal movement away from between said stacks of documents, wherein said other moveable platform supports both stacks of documents and said one moveable platform is moved to a position beneath said first and second stacks of documents, said one moveable platform 20 adapted to support a third stack of documents adjacent said second stack of documents.

9. The apparatus of Claim 5 wherein said first platform is slidably and rotatably mounted on a stationary shaft forming part of the apparatus, drive means adapted to engage said first

platform to drive said first platform substantially vertically upward and to prevent said first platform from moving substantially vertically downward when said first platform is in engagement with said drive means, and to allow substantially vertical downward movement of said first platform when said first platform is moved out of engagement with said drive means.

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10. The apparatus of claim 6 wherein said first and second platforms are slidably and rotatably mounted on respective stationary shafts forming part of the apparatus, first and second drive means adapted to engage said first and second platforms, respectively, and to drive said first and second platforms independently in a substantially upward direction and to prevent either of said first or second platforms from moving substantially vertically downward when said first and second platforms are in engagement with said drive means, each of said platforms rotatable out of engagement with said drive means to allow movement of said first and second platforms in a substantially vertical downward direction.

15. The apparatus of claim 1 wherein the device for capturing the image of the delivery point code is disposed above the feed station and is adjustable to capture an image of a delivery point code at any location on the topmost document of said stack of documents on said platform assembly.

20. The apparatus of claim 1 wherein the device for capturing the image of the delivery point code is a closed couple device camera that creates a digital image of the delivery point code on the topmost document in said stack, and transmits said digital image to said data processing unit.

13. The apparatus of claim 1 wherein said document unloading assembly includes a first document engaging device adapted to move from a first position where the first document engaging device engages the leading edge of the topmost document of the stack of documents to a second position where the first document engagement device, while engaging the leading edge of the topmost document, lifts the leading edge of the topmost document from the stack of documents.

14. The apparatus of claim 13 wherein said first document engaging device is mounted on a support plate, said support plate being pivotally mounted to move between a first lateral extended position and a second lateral retracted position on said apparatus adjacent said feeding station; said support plate moveable from said first lateral extended position to said second lateral retracted position after said image capture device has captured the delivery point code on the topmost of said documents in said stack.

15. The apparatus of claim 13 wherein said document unloading assembly includes a second document engaging device adapted in a first position to engage the leading edge of the document when the leading edge of the document is lifted, said second document engaging device moveable in a substantially horizontal direction to a second position where the engaged document is released and deposited on said buffer platform disposed substantially above said collation conveyor.

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16. The apparatus of claim 15 wherein said second document engaging device comprises a stationary jaw member adapted to engage the underside of the lifted leading edge of said topmost document, and a moveable clamping member adapted to forcefully engage the topside of the

topmost document and firmly hold the document between the stationary jaw member and the moveable clamping member as said second document engaging device moves said topmost document from said stack to said buffer platform.

5 17. The apparatus of claim 16 wherein said second document engaging device moves in a linear direction wherein said topmost document is moved from said stack to said buffer platform.

10 18. The apparatus of claim 14 wherein said first document engaging device includes a plurality of vacuum gripping devices operatively connected to a vacuum source, said plurality of vacuum gripping devices mounted on a mounting plate slidably attached to said support plate for vertical movement of said plurality of vacuum gripping devices relative to said support plate.

15 19. The apparatus of claim 18 including an actuating mechanism operatively connected to the data processing unit and to said slideable mounting plate to control the movement of said slideable mounting plate and said plurality of vacuum gripping devices.

20 20. The apparatus of claim 15 wherein the document positioning device includes a retractable stopping element adapted to move from a document engaging position to a retracted position, said retractable stopping element when in said document engaging position engaging said topmost document and retaining said topmost document on said buffer platform as said second document engaging device moves beyond said second position of said document engaging device, said second document engaging device releasing said topmost document onto said buffer platform when said second document engaging device moves beyond said second position of said document

engaging device.

21. The apparatus of claim 20 wherein an upper surface of said buffer platform includes at least one groove extending in the direction of movement of said buffer platform; said retractable 5 stopping element having at least one finger extending into said at least one groove when said retractable stopping element is in said document engaging position and said buffer platform is located substantially over said collation conveyor, said topmost document abutting said at least one finger and coming to rest on said buffer platform.

10 22. The apparatus of claim 21 including control means to move said buffer platform from said first position to said second position; said at least one finger of said retractable stopping element sliding in said at least one groove as said buffer platform moves to said second position and said retractable stopping element is in said document engaging position; said at least one finger abutting said topmost document and retaining the position of said topmost document as said buffer platform 15 slides out from under the topmost document, said topmost document being deposited onto said collation conveyor when said buffer platform reaches said second position.

23. The apparatus of claim 21 including control means to move said buffer platform from said first position to said second position and back to said first position;
20 means to move said retractable stopping element to a retracted position, removing said at least one finger from said at least one groove;
said buffer platform moved from said first position to said second position by said control means with said retractable stopping element in said retracted position and said document remaining

on said buffer platform;

 said retractable stopping element moved to said document engaging position when said buffer platform is in said second position;

5 said document held in position by said retractable stopping element as said buffer platform moves from said second position back to said first position and out from under said document;

 said document being deposited upon said reject station when said buffer platform returns to said first position.

24. The apparatus of claim 22 wherein said control means is operatively connected to
10 said data processing unit, said data processing unit generating a first signal indicating the presence
 of a match between said delivery point code on said document disposed on said buffer platform and
 a delivery point designation corresponding to said predetermined location on said collation
 conveyor, and said predetermined location on said collation conveyor is substantially beneath said
 buffer platform.

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25. The apparatus of claim 22 wherein said data processing unit generates a signal
 indicating the absence of a match between said delivery point code on said document disposed on
 said buffer platform and a delivery point designation corresponding to the predetermined location
 on the collation conveyor substantially beneath said buffer platform, and said buffer platform
20 remains in said first position supporting said document until said data processing unit detects said
 match.

26. The apparatus of claim 21 wherein said control means is adapted to move said buffer

platform from said first position to said second position and back to said first position;

a buffer control signal generated by said data processing unit, said buffer control signal transmitted to said means for moving said buffer platform and said retractable stopping element to move said retractable stopping element to its retracted position, removing said at least one finger 5 from said at least one groove;

said buffer control signal also initiating movement of said buffer platform from said first position to said second position of said buffer platform, said topmost document remaining supported by said buffer platform as said buffer platform moves to said second position;

said retractable stopping element moving to said document engaging position when said 10 buffer platform is in said second position, said at least one finger engaging a trailing edge of said document and holding said document in a stationary position as said buffer platform moves from said second position to said first position and moves out from under said document;

said document being deposited on said reject conveyor when said buffer platform reaches said first position of said buffer platform.

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27. The apparatus of claim 23 wherein said control means receives a second signal from said data processing unit indicating one of an unreadable delivery point code on said topmost document and a delivery point code which is in improper sequence, said control means, upon receipt of said second signal actuating said apparatus to:

- 20 (a) move said retractable stopping element to a retracted position;
- (b) move said buffer platform from said first position to said second position;
- (c) move said retractable stopping element to said document engaging position; and
- (d) moving said buffer platform from said second position to said first position, said

buffer platform moving out from under said document.

28. A method of depositing documents at a predetermined location on a moveable
collation conveyor for distribution of said documents to a predetermined delivery point, each
5 document imprinted with code designating a distinct delivery point, said method comprising the
steps of:

- a) providing a stack of said documents in a predetermined sequence;
- b) electronically capturing an image of said code designating a distinct delivery point;
- 10 c) transmitting said electronic image to a data processing unit;
- d) determining from said electronic image the presence or absence of a match between
said delivery point code on a topmost document in said stack and said predetermined location on
said moveable collection conveyor;
- e) transferring said topmost document to said moveable collation conveyor upon the
15 determination by the data processing unit of a match between said delivery point code and said
predetermined location on said moveable collection conveyor.

29. The method of claim 28 where the step of providing a stack of documents in sequence
comprises the steps of feeding said documents in sequence towards a feed station, said topmost
20 document in said stack disposed within the focal array of an electronic image capture device, and
removing said topmost documents from said stack of documents subsequent to said step of
electronically capturing the image of said code designating a distinct delivery point.

30. The method of claim 28 including the further step of retaining said topmost document on a buffer platform disposed substantially above said moveable collation conveyor when said data processing unit detects the absence of a match between the delivery point code on the topmost document and said predetermined location on said moveable collation conveyor.

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31. The method of claim 28 including the further step of transferring said topmost document to a reject station upon the data processing unit detecting one of the topmost documents being in an improper position in said sequence, or said topmost document having an unreadable distinct delivery point code.

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32. The method of claim 28 wherein the step of transferring said topmost document to said moveable collation conveyor when a match is determined includes the steps of transferring said topmost document to be supported by a buffer platform, said buffer platform positioned substantially above said moveable collation conveyor, and removing said buffer platform from under the topmost document to deposit said topmost document onto said predetermined location on said moveable collation conveyor.

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33. The method of claim 30 wherein the step of retaining the topmost document on the buffer platform includes the step of advancing the document from the top of said stack and onto said buffer platform, and halting the advance of said document when said document is fully supported by said buffer platform.

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34. The method of claim 31 wherein the step of transferring said topmost document to

said reject station comprises the steps of:

- a) moving the buffer platform to a position substantially above said reject station as said buffer platform supports said topmost document;
- b) engaging said topmost document to restrain said topmost documents against movement when said buffer platform is in said position; and
- c) moving said buffer platform back to a position substantially above said collation conveyor, said buffer platform moving out from under said topmost document and positioning said topmost document onto said reject station.

10 35. A method of depositing a plurality of stacks of similar documents to form a plurality of groups of documents on a moveable collation conveyor, each group of documents designated for distribution to a predetermined district delivery point, the moveable collation conveyor having a plurality of pockets, each pocket being designated with said district delivery point location, each pocket designated to receive one document from each of said stacks of similar documents, said documents in a single pocket designated for delivery to a district delivery point, each document imprinted with code designating a district delivery point, comprising the steps of:

- a) providing each stack of similar documents in a predetermined sequence to a separate one of a plurality of collating devices;
- b) moving said pockets of said collation conveyor sequentially beneath each of said collating devices;
- c) electronically capturing the images of each code of the topmost document in each stack of similar document;
- d) transmitting said plurality of electronic images to a data processing unit;

e) determining from said electronic images the presence or absence of a match between said delivery point code on each of said respective topmost documents in said plurality of stacks and said delivery point designation of the pocket of the collation conveyor when said pocket is moved adjacent each of said respective topmost documents; and

5 f) transferring a topmost document to said adjacent pocket of said collation conveyor upon the determination of a match between a topmost document and the delivery point designation of the pocket of the collation conveyor adjacent said topmost document.

36. The method of claim 35 including the further step of retaining said topmost document
10 out of said pocket of said collation conveyor upon the determination of an absence of a match between said delivery point code on said topmost document and the district delivery point designation of the pocket of the collation conveyor adjacent said topmost documents.

37. The method of claim 35 including the further steps of:

15 a) determining the readability of the delivery point code imprinted on each topmost document of each stack of similar documents; and
b) transferring each document having an unreadable district delivery point code imprinted on said document to a reject collection location.

20 38. The method of claim 35 including the further steps of:

a) establishing the proper sequences of delivery of each document in each said stack of similar documents; and
b) transferring each document which is not in said proper sequence in a respective stack

of similar documents to a reject collection location.

39. The method of claim 35 including the step of automatically depositing the group of documents in each pocket of the collation conveyor into a container, each group of documents being
5 deposited in said container in a predetermined delivery route sequence.

40. An apparatus for collating documents disposed in a plurality of stacks, each stack including similar documents, each document in a stack imprinted with different address code designating a distinct delivery point, the documents in each stack being arranged in a predetermined
10 sequence, said apparatus for collating documents comprising:

a plurality of document collating stations;

a movable collation conveyor extending along said plurality of collation stations, said collation conveyor including a plurality of pockets, each pocket designated by a distinct delivery point address;

15 each said collation station including:

a) an advancing device adapted to advance a stack of documents towards a feeding station;

b) the feeding station including an image capture device to capture the image of the delivery point code on each document in the stack of documents as each document reaches
20 the top of its respective stack, each said image being electronically stored in a data processing unit;

c) a movable buffer platform, movable from a first position adjacent said feeding station and above said collation conveyor to a second position over a document reject station, movement of said buffer platform under the control of said data processing unit;

d) a document unloading assembly engaging the topmost document in the stack of documents, and position said topmost document on said moveable buffer platform;

e) a document positioning device moveable between a first position and a second position, said second document engaging element adapted to engage the document on said buffer platform in said first position of said document engaging element and to deposit said document onto a pocket on said collation conveyor as said buffer platform moves from said first position to said second position of said buffer platform, said pocket having a distinct delivery point designation corresponding to the district delivery point code on said topmost document.

10 41. The apparatus of claim 40 wherein the document positioning device is further adapted to move to said second position and retain said document on said buffer platform when said buffer platform moves to the second position of said buffer platform; said document being placed over a reject station when said buffer station is in said second position of said buffer platform;

15 42. The apparatus of claim 41 wherein said document positioning device is adapted to move to said first position and engage said document on said buffer platform when said buffer platform is in said second position, and to deposit said document from said buffer platform to said reject conveyor when said buffer platform is moved to said first platform.